

SEQUENCE LISTING



<110> HAWIGER, DANIEL  
NUSSENZWEIG, MICHEL  
STEINMAN, RALPH M.  
BONIFAZ, LAURA

<120> ENHANCED ANTIGEN DELIVERY AND MODULATION OF THE IMMUNE  
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<151> 2000-06-05

<150> PCT/US96/01383

<151> 1996-01-31

<150> 08/381,528

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<170> PatentIn Ver. 3.3

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Ala Gly Leu Leu Met Leu Leu Phe Trp Phe Phe Asp Leu Ala Glu Pro  
35 40 45

Ser Gly Arg Ala Ala Asn Asp Pro Phe Thr Ile Val His Gly Asn Thr  
50 55 60

Gly Lys Cys Ile Lys Pro Val Tyr Gly Trp Ile Val Ala Asp Asp Cys  
65 70 75 80

Asp Glu Thr Glu Asp Lys Leu Trp Lys Trp Val Ser Gln His Arg Leu  
85 90 95

Phe His Leu His Ser Gln Lys Cys Leu Gly Leu Asp Ile Thr Lys Ser  
100 105 110

Val Asn Glu Leu Arg Met Phe Ser Cys Asp Ser Ser Ala Met Leu Trp  
115 120 125

Trp Lys Cys Glu His His Ser Leu Tyr Gly Ala Ala Arg Tyr Arg Leu

130	135	140
Ala Leu Lys Asp Gly His Gly Thr Ala Ile Ser Asn Ala Ser Asp Val 145 150 155 160		
Trp Lys Lys Gly Gly Ser Glu Glu Ser Leu Cys Asp Gln Pro Tyr His 165 170 175		
Glu Ile Tyr Thr Arg Asp Gly Asn Ser Tyr Gly Arg Pro Cys Glu Phe 180 185 190		
Pro Phe Leu Ile Asp Gly Thr Trp His His Asp Cys Ile Leu Asp Glu 195 200 205		
Asp His Ser Gly Pro Trp Cys Ala Thr Thr Leu Asn Tyr Glu Tyr Asp 210 215 220		
Arg Lys Trp Gly Ile Cys Leu Lys Pro Glu Asn Gly Cys Glu Asp Asn 225 230 235 240		
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Thr Ala Leu Ser Trp Lys Glu Ala Tyr Val Ser Cys Gln Asn Gln Gly 260 265 270		
Ala Asp Leu Leu Ser Ile Asn Ser Ala Ala Glu Leu Thr Tyr Leu Lys 275 280 285		
Asp Lys Glu Gly Ile Ala Lys Ile Phe Trp Ile Gly Leu Asn Gln Leu 290 295 300		
Tyr Ser Ala Arg Gly Trp Glu Trp Ser Asp His Lys Pro Leu Asn Phe 305 310 315 320		
Leu Asn Trp Asp Pro Asp Arg Pro Ser Ala Pro Thr Ile Gly Gly Ser 325 330 335		
Ser Cys Ala Arg Met Asp Ala Glu Ser Gly Leu Trp Gln Ser Phe Ser 340 345 350		
Cys Glu Ala Gln Leu Pro Tyr Val Cys Arg Lys Pro Leu Asn Asn Thr 355 360 365		
Val Glu Leu Thr Asp Val Trp Thr Tyr Ser Asp Thr Arg Cys Asp Ala 370 375 380		
Gly Trp Leu Pro Asn Asn Gly Phe Cys Tyr Leu Leu Val Asn Glu Ser 385 390 395 400		
Asn Ser Trp Asp Lys Ala His Ala Lys Cys Lys Ala Phe Ser Ser Asp 405 410 415		
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Leu His Asn Glu Asp Ile Lys Glu Glu Val Trp Ile Gly Leu Lys Asn 435 440 445		
Ile Asn Ile Pro Thr Leu Phe Gln Trp Ser Asp Gly Thr Glu Val Thr 450 455 460		
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465		470		475		480
Pro Asn Cys Val	Ser Tyr Leu Gly Glu	Leu Gly Gln Trp Lys Val Gln				
	485	490			495	
Ser Cys Glu Glu	Lys Leu Lys Tyr Val	Cys Lys Arg Lys Gly Glu Lys				
	500	505			510	
Leu Asn Asp Ala	Ser Ser Asp Lys Met Cys Pro	Pro Asp Glu Gly Trp				
	515	520			525	
Lys Arg His Gly	Glu Thr Cys Tyr Lys Ile Tyr	Glu Asp Glu Val Pro				
	530	535			540	
Phe Gly Thr Asn	Cys Asn Leu Thr Ile Thr	Ser Arg Phe Glu Gln Glu				
	545	550			555	560
Tyr Leu Asn Asp	Leu Met Lys Lys Tyr Asp	Lys Ser Leu Arg Lys Tyr				
	565	570			575	
Phe Trp Thr Gly	Leu Arg Asp Val Asp	Ser Cys Gly Glu Tyr Asn Trp				
	580	585			590	
Ala Thr Val Gly	Gly Arg Arg Arg Ala Val Thr	Phe Ser Asn Trp Asn				
	595	600			605	
Phe Leu Glu Pro	Ala Ser Pro Gly Gly Cys Val	Ala Met Ser Thr Gly				
	610	615			620	
Lys Ser Val Gly	Lys Trp Glu Val Lys Asp Cys	Arg Ser Phe Lys Ala				
	625	630			635	640
Leu Ser Ile Cys	Lys Lys Met Ser Gly Pro	Leu Gly Pro Glu Glu Ala				
	645	650			655	
Ser Pro Lys Pro	Asp Asp Pro Cys Pro Glu Gly	Trp Gln Ser Phe Pro				
	660	665			670	
Ala Ser Leu Ser	Cys Tyr Lys Val Phe His Ala	Glu Arg Ile Val Arg				
	675	680			685	
Lys Arg Asn Trp	Glu Glu Ala Glu Arg Phe Cys	Gln Ala Leu Gly Ala				
	690	695			700	
His Leu Ser Ser	Phe Ser His Val Asp Glu Ile	Lys Glu Phe Leu His				
	705	710			715	720
Phe Leu Thr Asp	Gln Phe Ser Gly Gln His Trp	Leu Trp Ile Gly Leu				
	725	730			735	
Asn Lys Arg Ser	Pro Asp Leu Gln Gly Ser Trp	Gln Trp Ser Asp Arg				
	740	745			750	
Thr Pro Val Ser	Thr Ile Ile Met Pro Asn Glu	Phe Gln Gln Asp Tyr				
	755	760			765	
Asp Ile Arg Asp	Cys Ala Ala Val Lys Val Phe	His Arg Pro Trp Arg				
	770	775			780	
Arg Gly Trp His	Phe Tyr Asp Asp Arg Glu Phe	Ile Tyr Leu Arg Pro				
	785	790			795	800
Phe Ala Cys Asp	Thr Lys Leu Glu Trp Val Cys	Gln Ile Pro Lys Gly				

805					810					815					
Arg	Thr	Pro	Lys	Thr	Pro	Asp	Trp	Tyr	Asn	Pro	Glu	Arg	Ala	Gly	Ile
			820					825					830		
His	Gly	Pro	Pro	Leu	Ile	Ile	Glu	Gly	Ser	Glu	Tyr	Trp	Phe	Val	Ala
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Asp	Leu	His	Leu	Asn	Tyr	Glu	Glu	Ala	Val	Leu	Tyr	Cys	Ala	Ser	Asn
			850			855					860				
His	Ser	Phe	Leu	Ala	Thr	Ile	Thr	Ser	Phe	Val	Gly	Leu	Lys	Ala	Ile
					870					875					880
Lys	Asn	Lys	Ile	Ala	Asn	Ile	Ser	Gly	Asp	Gly	Gln	Lys	Trp	Trp	Ile
				885					890					895	
Arg	Ile	Ser	Glu	Trp	Pro	Ile	Asp	Asp	His	Phe	Thr	Tyr	Ser	Arg	Tyr
			900					905					910		
Pro	Trp	His	Arg	Phe	Pro	Val	Thr	Phe	Gly	Glu	Glu	Cys	Leu	Tyr	Met
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Ser	Ala	Lys	Thr	Trp	Leu	Ile	Asp	Leu	Gly	Lys	Pro	Thr	Asp	Cys	Ser
			930			935					940				
Thr	Lys	Leu	Pro	Phe	Ile	Cys	Glu	Lys	Tyr	Asn	Val	Ser	Ser	Leu	Glu
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Lys	Tyr	Ser	Pro	Asp	Ser	Ala	Ala	Lys	Val	Gln	Cys	Ser	Glu	Gln	Trp
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Ile	Pro	Phe	Gln	Asn	Lys	Cys	Phe	Leu	Lys	Ile	Lys	Pro	Val	Ser	Leu
			980					985					990		
Thr	Phe	Ser	Gln	Ala	Ser	Asp	Thr	Cys	His	Ser	Tyr	Gly	Gly	Thr	Leu
			995				1000					1005			
Pro	Ser	Val	Leu	Ser	Gln	Ile	Glu	Gln	Asp	Phe	Ile	Thr	Ser	Leu	Leu
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Pro	Asp	Met	Glu	Ala	Thr	Leu	Trp	Ile	Gly	Leu	Arg	Trp	Thr	Ala	Tyr
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Glu	Lys	Ile	Asn	Lys	Trp	Thr	Asp	Asn	Arg	Glu	Leu	Thr	Tyr	Ser	Asn
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Phe	His	Pro	Leu	Leu	Val	Ser	Gly	Arg	Leu	Arg	Ile	Pro	Glu	Asn	Phe
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Phe	Glu	Glu	Glu	Ser	Arg	Tyr	His	Cys	Ala	Leu	Ile	Leu	Asn	Leu	Gln
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Lys	Ser	Pro	Phe	Thr	Gly	Thr	Trp	Asn	Phe	Thr	Ser	Cys	Ser	Glu	Arg
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His	Phe	Val	Ser	Leu	Cys	Gln	Lys	Tyr	Ser	Glu	Val	Lys	Ser	Arg	Gln
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Thr	Leu	Gln	Asn	Ala	Ser	Glu	Thr	Val	Lys	Tyr	Leu	Asn	Asn	Leu	Tyr
				1125				1130						1135	
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Gly Leu Phe Ser Gln Asp Asp Glu Leu Asn Phe Gly Trp Ser Asp Gly 1185 1190 1195 1200		
Lys Arg Leu His Phe Ser Arg Trp Ala Glu Thr Asn Gly Gln Leu Glu 1205 1210 1215		
Asp Cys Val Val Leu Asp Thr Asp Gly Phe Trp Lys Thr Val Asp Cys 1220 1225 1230		
Asn Asp Asn Gln Pro Gly Ala Ile Cys Tyr Tyr Pro Gly Asn Glu Thr 1235 1240 1245		
Glu Lys Glu Val Lys Pro Val Asp Ser Val Lys Cys Pro Ser Pro Val 1250 1255 1260		
Leu Asn Thr Pro Trp Ile Pro Phe Gln Asn Cys Cys Tyr Asn Phe Ile 1265 1270 1275 1280		
Ile Thr Lys Asn Arg His Met Ala Thr Thr Gln Asp Glu Val His Thr 1285 1290 1295		
Lys Cys Gln Lys Leu Asn Pro Lys Ser His Ile Leu Ser Ile Arg Asp 1300 1305 1310		
Glu Lys Glu Asn Asn Phe Val Leu Glu Gln Leu Leu Tyr Phe Asn Tyr 1315 1320 1325		
Met Ala Ser Trp Val Met Leu Gly Ile Thr Tyr Arg Asn Asn Ser Leu 1330 1335 1340		
Met Trp Phe Asp Lys Thr Pro Leu Ser Tyr Thr His Trp Arg Ala Gly 1345 1350 1355 1360		
Arg Pro Thr Ile Lys Asn Glu Arg Phe Leu Ala Gly Leu Ser Thr Asp 1365 1370 1375		
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Lys Glu Glu Tyr Asn Thr Thr Leu Pro Gln Phe Met Pro Tyr Glu Asp 1410 1415 1420		
Gly Ile Tyr Ser Val Ile Gln Lys Lys Val Thr Trp Tyr Glu Ala Leu 1425 1430 1435 1440		
Asn Met Cys Ser Gln Ser Gly Gly His Leu Ala Ser Val His Asn Gln 1445 1450 1455		
Asn Gly Gln Leu Phe Leu Glu Asp Ile Val Lys Arg Asp Gly Phe Pro 1460 1465 1470		
Leu Trp Val Gly Leu Ser Ser His Asp Gly Ser Glu Ser Ser Phe Glu		

1475	1480	1485
Trp Ser Asp Gly Ser Thr Phe Asp Tyr Ile Pro Trp Lys Gly Gln Thr 1490	1495	1500
Ser Pro Gly Asn Cys Val Leu Leu Asp Pro Lys Gly Thr Trp Lys His 1505	1510	1515 1520
Glu Lys Cys Asn Ser Val Lys Asp Gly Ala Ile Cys Tyr Lys Pro Thr 1525	1530	1535
Lys Ala Lys Lys Leu Ser Arg Leu Thr Tyr Ser Ser Arg Cys Pro Ala 1540	1545	1550
Ala Lys Glu Asn Gly Ser Arg Trp Ile Gln Tyr Lys Gly His Cys Tyr 1555	1560	1565
Lys Ser Asp Gln Ala Leu His Ser Phe Ser Glu Ala Lys Lys Leu Cys 1570	1575	1580
Ser Lys His Asp His Ser Ala Thr Ile Val Ser Ile Lys Asp Glu Asp 1585	1590	1595 1600
Glu Asn Lys Phe Val Ser Arg Leu Met Arg Glu Asn Asn Asn Ile Thr 1605	1610	1615
Met Arg Val Trp Leu Gly Leu Ser Gln His Ser Val Asp Gln Ser Trp 1620	1625	1630
Ser Trp Leu Asp Gly Ser Glu Val Thr Phe Val Lys Trp Glu Asn Lys 1635	1640	1645
Ser Lys Ser Gly Val Gly Arg Cys Ser Met Leu Ile Ala Ser Asn Glu 1650	1655	1660
Thr Trp Lys Lys Val Glu Cys Glu His Gly Phe Gly Arg Val Val Cys 1665	1670	1675 1680
Lys Val Pro Leu Gly Pro Asp Tyr Thr Ala Ile Ala Ile Ile Val Ala 1685	1690	1695
Thr Leu Ser Ile Leu Val Leu Met Gly Gly Leu Ile Trp Phe Leu Phe 1700	1705	1710
Gln Arg His Arg Leu His Leu Ala Gly Phe Ser Ser Val Arg Tyr Ala 1715	1720	1725
Gln Gly Val Asn Glu Asp Glu Ile Met Leu Pro Ser Phe His Asp Xaa 1730	1735	1740
Ile Leu Leu Lys Val Phe Xaa Phe Ala Leu Met Cys Tyr Glu Lys Leu 1745	1750	1755 1760
Val Thr Xaa Asn Val Gln Cys Gln Tyr Leu Leu Cys Ser Lys Val Glu 1765	1770	1775
Leu Leu Asn Thr Phe Ser Val Val Xaa Ile Xaa Ala Cys Ala Gly Ile 1780	1785	1790
His Ser Xaa Phe Pro Ala Lys Cys His Val Tyr His Pro Asn Xaa Xaa 1795	1800	1805
Asn Gly Gly Asp Ser Lys Ala Gly Thr Glu Val Lys Leu Phe Asp Ser		

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Arg

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cccatcgcat	gaaacattac	atgcaaatca	aatattacag	gattattatt	gacacgtgat	6900
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gcgagctgct	cctgctccag	cagcagatgg	agtgggagca	gtgtctcaag	atttgggctaa	8220
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ttacttccct	gactggcaaa	actacacacc	agggccaggg	accabatacc	cattgacatt	8520
tgatgggtgc	ttcaagctag	taccagttga	tccaagcgaa	gtagaggag	ctaataagg	8580
agagaacaac	tgctgtttac	accccgcatg	ccagcatgga	atagaggatg	aagaaagaga	8640
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cgcattgcaag	ccg					8953

<210> 21  
 <211> 497  
 <212> PRT  
 <213> Human immunodeficiency virus

<400> 21

Met	Gly	Ala	Arg	Ala	Ser	Ile	Leu	Ser	Gly	Gly	Lys	Leu	Asp	Asp	Trp	1	5	10	15
Glu	Lys	Ile	Arg	Leu	Arg	Pro	Gly	Gly	Lys	Lys	Gln	Tyr	Arg	Ile	Lys	20	25	30	
His	Leu	Val	Trp	Ala	Ser	Arg	Glu	Leu	Asp	Arg	Phe	Ala	Leu	Asn	Pro	35	40	45	
Gly	Leu	Leu	Glu	Ser	Ala	Lys	Gly	Cys	Gln	Gln	Ile	Leu	Val	Gln	Leu	50	55	60	
Gln	Pro	Ala	Leu	Gln	Thr	Gly	Thr	Glu	Glu	Ile	Lys	Ser	Leu	Tyr	Asn	65	70	75	
Thr	Val	Ala	Thr	Leu	Tyr	Cys	Val	His	Gln	Arg	Ile	Glu	Ile	Lys	Asp	85	90	95	
Thr	Lys	Glu	Ala	Leu	Asp	Lys	Ile	Glu	Glu	Ile	Gln	Asn	Lys	Asn	Lys	100	105	110	
Gln	Gln	Thr	Gln	Lys	Ala	Glu	Thr	Asp	Lys	Lys	Asp	Asn	Ser	Gln	Val	115	120	125	
Ser	Gln	Asn	Tyr	Pro	Ile	Val	Gln	Asn	Leu	Gln	Gly	Gln	Pro	Val	His	130	135	140	
Gln	Ala	Leu	Ser	Pro	Arg	Thr	Leu	Asn	Ala	Trp	Val	Lys	Val	Ile	Glu	145	150	155	
Glu	Lys	Ala	Phe	Ser	Pro	Glu	Val	Ile	Pro	Met	Phe	Ser	Ala	Leu	Ser	165	170	175	
Glu	Gly	Ala	Thr	Pro	Gln	Asp	Leu	Asn	Thr	Met	Leu	Asn	Thr	Ile	Gly	180	185	190	
Gly	His	Gln	Ala	Ala	Met	Gln	Met	Leu	Lys	Asp	Thr	Ile	Asn	Glu	Glu	195	200	205	
Ala	Ala	Glu	Trp	Asp	Arg	Val	His	Pro	Val	His	Ala	Gly	Pro	Val	Ala	210	215	220	
Pro	Gly	Gln	Val	Arg	Glu	Pro	Arg	Gly	Ser	Asp	Ile	Ala	Gly	Thr	Thr	225	230	235	
Ser	Asn	Leu	Gln	Glu	Gln	Ile	Gly	Trp	Met	Thr	Gly	Asn	Pro	Pro	Ile	245	250	255	
Pro	Val	Gly	Glu	Ile	Tyr	Lys	Arg	Trp	Ile	Ile	Leu	Gly	Leu	Asn	Lys	260	265	270	
Ile	Val	Arg	Met	Tyr	Ser	Pro	Val	Ser	Ile	Leu	Asp	Ile	Arg	Gln	Gly	275	280	285	
Pro	Lys	Glu	Pro	Phe	Arg	Asp	Tyr	Val	Asp	Arg	Phe	Phe	Lys	Ala	Leu	290	295	300	
Arg	Ala	Glu	Gln	Ala	Thr	Gln	Asp	Val	Lys	Asn	Trp	Met	Thr	Asp	Thr	305	310	315	
Leu	Leu	Val	Gln	Asn	Ala	Asn	Pro	Asp	Cys	Lys	Thr	Ile	Leu	Lys	Ala	325	330	335	

Leu Gly Ser Gly Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly  
 340 345 350  
 Val Gly Gly Pro Gly His Lys Ala Arg Val Leu Ala Glu Ala Met Ser  
 355 360 365  
 Gln Val Thr Asn Thr Asn Ile Met Met Gln Arg Gly Asn Phe Arg Asp  
 370 375 380  
 His Lys Arg Ile Val Lys Cys Phe Asn Cys Gly Lys Gln Gly His Ile  
 385 390 395 400  
 Ala Lys Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly  
 405 410 415  
 Lys Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe  
 420 425 430  
 Leu Gly Lys Ile Trp Pro Ser Ser Lys Gly Arg Pro Gly Asn Phe Leu  
 435 440 445  
 Gln Ser Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Leu Gly Phe  
 450 455 460  
 Gly Glu Glu Ile Pro Ser Pro Lys Gln Glu Pro Lys Asp Lys Glu Leu  
 465 470 475 480  
 Tyr Pro Leu Thr Ser Leu Arg Ser Leu Phe Gly Ser Asp Pro Leu Ser  
 485 490 495

Gln

<210> 22  
 <211> 1001  
 <212> PRT  
 <213> Human immunodeficiency virus

<400> 22  
 Phe Phe Arg Glu Asp Leu Ala Phe Gln Gln Arg Glu Ala Arg Glu Phe  
 1 5 10 15  
 Ser Pro Glu Gln Thr Arg Ala Asn Ser Pro Thr Ser Arg Glu Pro Arg  
 20 25 30  
 Val Arg Arg Gly Asp Pro Leu Pro Glu Thr Gly Ala Glu Gly Gln Gly  
 35 40 45  
 Thr Val Ser Ser Asn Phe Pro Gln Ile Thr Leu Trp Gln Arg Pro Leu  
 50 55 60  
 Val Thr Ile Arg Ile Gly Gly Gln Leu Arg Glu Ala Leu Leu Asp Thr  
 65 70 75 80  
 Gly Ala Asp Asp Thr Val Leu Glu Glu Ile Asp Leu Pro Gly Lys Trp  
 85 90 95  
 Lys Pro Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val Arg Gln  
 100 105 110  
 Tyr Asn Glu Val Pro Ile Glu Ile Glu Gly Lys Lys Ala Ile Gly Thr  
 115 120 125



Val	Leu	Ile	Gly	Pro	Thr	Pro	Val	Asn	Ile	Ile	Gly	Arg	Asn	Met	Leu	130	135	140
Thr	Gln	Leu	Gly	Cys	Thr	Leu	Asn	Phe	Pro	Ile	Ser	Pro	Ile	Glu	Thr	145	150	155
Val	Pro	Val	Lys	Leu	Lys	Pro	Gly	Met	Asp	Gly	Pro	Lys	Ile	Lys	Gln	165	170	175
Trp	Pro	Leu	Thr	Glu	Glu	Lys	Ile	Lys	Ala	Leu	Thr	Gln	Ile	Cys	Ala	180	185	190
Glu	Leu	Glu	Glu	Glu	Gly	Lys	Ile	Ser	Arg	Ile	Gly	Pro	Glu	Asn	Pro	195	200	205
Tyr	Asn	Thr	Pro	Val	Phe	Ala	Ile	Lys	Lys	Lys	Asp	Ser	Thr	Lys	Trp	210	215	220
Arg	Lys	Leu	Val	Asp	Phe	Arg	Glu	Leu	Asn	Lys	Arg	Thr	Gln	Asp	Phe	225	230	235
Trp	Glu	Val	Gln	Leu	Gly	Ile	Pro	His	Pro	Ala	Gly	Leu	Lys	Lys	Lys	245	250	255
Lys	Ser	Val	Thr	Val	Leu	Asp	Val	Gly	Asp	Ala	Tyr	Phe	Ser	Val	Pro	260	265	270
Leu	Tyr	Glu	Asp	Phe	Arg	Lys	Tyr	Thr	Ala	Phe	Thr	Ile	Pro	Ser	Ile	275	280	285
Asn	Asn	Glu	Thr	Pro	Gly	Ile	Arg	Tyr	Gln	Tyr	Asn	Val	Leu	Pro	Gln	290	295	300
Gly	Trp	Lys	Gly	Ser	Pro	Ala	Ile	Phe	Gln	Cys	Ser	Met	Thr	Lys	Ile	305	310	315
Leu	Lys	Pro	Phe	Arg	Glu	Arg	Asn	Pro	Glu	Ile	Val	Ile	Tyr	Gln	Tyr	325	330	335
Met	Asp	Asp	Leu	Tyr	Val	Gly	Ser	Asp	Leu	Glu	Ile	Glu	Gln	His	Arg	340	345	350
Arg	Lys	Ile	Lys	Glu	Leu	Arg	Glu	His	Leu	Leu	Lys	Trp	Gly	Phe	Tyr	355	360	365
Thr	Pro	Asp	Lys	Lys	His	Gln	Lys	Glu	Pro	Pro	Phe	Leu	Trp	Met	Gly	370	375	380
Tyr	Glu	Leu	His	Pro	Asp	Lys	Trp	Thr	Val	Gln	Pro	Ile	Gln	Leu	Pro	385	390	395
Glu	Lys	Glu	Asp	Trp	Thr	Val	Asn	Asp	Ile	Gln	Lys	Leu	Val	Gly	Lys	405	410	415
Leu	Asn	Trp	Ala	Ser	Gln	Ile	Tyr	Pro	Gly	Ile	Lys	Ile	Lys	Glu	Leu	420	425	430
Cys	Lys	Leu	Ile	Arg	Gly	Ala	Lys	Ala	Leu	Thr	Asp	Ile	Val	Pro	Leu	435	440	445
Thr	Arg	Glu	Ala	Glu	Leu	Glu	Leu	Ala	Glu	Asn	Lys	Glu	Ile	Leu	Lys	450	455	460

Glu	Pro	Val	His	Gly	Val	Tyr	Tyr	Asp	Pro	Ala	Arg	Glu	Leu	Ile	Ala	
465					470					475					480	
Glu	Val	Gln	Lys	Gln	Gly	Leu	Asp	Gln	Trp	Thr	Tyr	Gln	Ile	Tyr	Gln	
				485					490					495		
Glu	Pro	Phe	Lys	Asn	Leu	Lys	Thr	Gly	Lys	Tyr	Ala	Lys	Arg	Arg	Ser	
			500					505					510			
Ala	His	Thr	Asn	Asp	Val	Lys	Gln	Leu	Ser	Gln	Val	Val	Gln	Lys	Ile	
		515					520					525				
Ala	Leu	Glu	Ala	Ile	Val	Ile	Trp	Gly	Lys	Thr	Pro	Lys	Phe	Arg	Leu	
	530					535					540					
Pro	Ile	Gln	Lys	Glu	Thr	Trp	Glu	Thr	Trp	Trp	Thr	Asp	Tyr	Trp	Gln	
545					550					555					560	
Ala	Thr	Trp	Ile	Pro	Glu	Trp	Glu	Phe	Val	Asn	Thr	Pro	Pro	Leu	Val	
				565					570					575		
Lys	Leu	Trp	Tyr	Gln	Leu	Glu	Lys	Glu	Pro	Ile	Met	Gly	Ala	Glu	Thr	
			580					585					590			
Phe	Tyr	Val	Asp	Gly	Ala	Ser	Asn	Arg	Glu	Thr	Lys	Val	Gly	Lys	Ala	
		595					600					605				
Gly	Tyr	Val	Thr	Asp	Lys	Gly	Arg	Gln	Lys	Val	Ile	Thr	Leu	Thr	Asp	
	610					615					620					
Thr	Thr	Asn	Gln	Lys	Thr	Glu	Leu	Gln	Ala	Ile	Tyr	Leu	Ala	Leu	Gln	
625					630					635					640	
Asp	Ser	Gly	Ile	Glu	Val	Asn	Ile	Val	Thr	Asp	Ser	Gln	Tyr	Ala	Leu	
				645					650					655		
Gly	Ile	Ile	Gln	Ala	Gln	Pro	Asp	Lys	Ser	Glu	Ser	Glu	Leu	Val	Asn	
			660					665					670			
Gln	Ile	Ile	Glu	Glu	Leu	Ile	Lys	Lys	Glu	Lys	Val	Tyr	Leu	Ser	Trp	
		675					680					685				
Val	Pro	Ala	His	Lys	Gly	Ile	Gly	Gly	Asn	Glu	Gln	Val	Asp	Lys	Leu	
	690					695					700					
Val	Ser	Ser	Gly	Ile	Arg	Lys	Val	Leu	Phe	Leu	Asp	Gly	Ile	Asp	Lys	
705					710					715				720		
Ala	Gln	Glu	Glu	His	Glu	Lys	Tyr	His	Ser	Asn	Trp	Arg	Ala	Met	Ala	
				725					730					735		
Ser	Asp	Phe	Asn	Leu	Pro	Pro	Val	Val	Ala	Lys	Glu	Ile	Val	Ala	Ser	
			740					745					750			
Cys	Asp	Lys	Cys	Gln	Leu	Lys	Gly	Glu	Ala	Met	His	Gly	Gln	Val	Asp	
		755					760					765				
Cys	Ser	Pro	Gly	Ile	Trp	Gln	Leu	Asp	Cys	Thr	His	Leu	Glu	Gly	Lys	
		770				775					780					
Val	Ile	Leu	Val	Ala	Val	His	Val	Ala	Ser	Gly	Tyr	Ile	Glu	Ala	Glu	
785					790					795					800	

Val Ile Pro Ala Glu Thr Gly Gln Glu Ala Ala Phe Phe Ile Leu Lys  
 805 810 815  
 Leu Ala Gly Gly Trp Pro Val Lys Ala Ile His Thr Asp Asn Gly Ser  
 820 825 830  
 Asn Phe Thr Ser Gly Ala Val Lys Ala Ala Cys Trp Trp Ala Asp Ile  
 835 840 845  
 Lys Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly Val Val  
 850 855 860  
 Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val Arg Glu  
 865 870 875 880  
 Gln Ala Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe Ile His  
 885 890 895  
 Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly Glu Arg  
 900 905 910  
 Ile Ile Asp Ile Ile Ala Thr Asp Ile Gln Thr Lys Glu Leu Gln Lys  
 915 920 925  
 Gln Ile Thr Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp Ser Arg  
 930 935 940  
 Asp Pro Ile Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly Glu Gly  
 945 950 955 960  
 Ala Val Val Ile Gln Asp Asn Ser Glu Ile Lys Val Val Pro Arg Arg  
 965 970 975  
 Lys Ala Lys Ile Ile Arg Asp Tyr Gly Lys Gln Met Ala Gly Asp Asp  
 980 985 990  
 Cys Val Ala Gly Arg Gln Asp Glu Asp  
 995 1000

<210> 23  
 <211> 101  
 <212> PRT  
 <213> Human immunodeficiency virus

<400> 23  
 Met Glu Pro Val Asp Pro Asn Arg Glu Pro Trp Asn His Pro Gly Ser  
 1 5 10 15  
 Gln Pro Lys Thr Ala Cys Thr Asn Cys Tyr Cys Lys Lys Cys Cys Tyr  
 20 25 30  
 His Cys Gln Val Cys Phe Leu Gln Lys Gly Leu Gly Ile Ser Tyr Gly  
 35 40 45  
 Arg Lys Lys Arg Arg Gln Arg Arg Ser Ala Pro Pro Gly Ser Lys Asn  
 50 55 60  
 His Gln Asp Leu Ile Pro Glu Gln Pro Leu Phe Gln Thr Gln Arg Lys  
 65 70 75 80  
 Pro Thr Gly Pro Glu Glu Ser Lys Lys Glu Val Glu Ser Lys Ala Glu

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      85                               90                               95
Pro Asp Arg Phe Asp
    100
<210> 24
<211> 116
<212> PRT
<213> Human immunodeficiency virus

<400> 24
Met Ala Gly Arg Ser Gly Asp Asn Asp Asp Gln Leu Leu Leu Ala Val
   1               5                   10                  15
Arg Ile Ile Lys Ile Leu Tyr Gln Ser Asn Pro Tyr Ser Lys Pro Asn
     20                25                 30
Gly Ser Arg Gln Ala Arg Arg Asn Arg Arg Arg Arg Trp Arg Ala Arg
   35              40              45
Gln Asn Gln Ile Asp Ser Ile Ser Glu Arg Ile Leu Ser Ser Cys Leu
   50                55                60
Gly Arg Pro Ala Glu Pro Val Pro Leu Gln Leu Pro Pro Ile Glu Arg
   65              70              75              80
Leu Arg Leu Asp Cys Ser Glu Asp Cys Gly Asn Ser Gly Thr Gln Gly
     85              90              95
Val Gly Asp Pro Gln Ile Ser Gly Glu Pro Cys Met Val Leu Gly Ala
    100            105            110
Gly Thr Lys Glu
    115

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Ser Leu Pro Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asp Met  
 85 90 95  
 Val Asp Gln Met Gln Glu Asp Ile Ile Ser Val Trp Asp Glu Ser Leu  
 100 105 110  
 Lys Pro Cys Val Lys Ile Thr Pro Leu Cys Val Thr Leu Asn Cys Ser  
 115 120 125  
 Asp Val Asn Ser Asn Asn Ser Thr Asp Ser Asn Ser Ser Ala Ser Asn  
 130 135 140  
 Asn Ser Pro Glu Ile Met Lys Asn Cys Ser Phe Asn Val Thr Thr Glu  
 145 150 155 160  
 Ile Arg Asn Lys Arg Lys Gln Glu Tyr Ala Leu Phe Tyr Arg Gln Asp  
 165 170 175  
 Val Val Pro Ile Asn Ser Asp Asn Lys Ser Tyr Ile Leu Ile Asn Cys  
 180 185 190  
 Asn Thr Ser Val Ile Lys Gln Ala Cys Pro Lys Val Ser Phe Gln Pro  
 195 200 205  
 Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys  
 210 215 220  
 Asn Asn Lys Thr Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr  
 225 230 235 240  
 Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu  
 245 250 255  
 Leu Asn Gly Ser Val Ala Glu Gly Asp Ile Ile Ile Arg Ser Glu Asn  
 260 265 270  
 Ile Ser Asp Asn Ala Lys Asn Ile Ile Val Gln Leu Asn Asp Thr Val  
 275 280 285  
 Glu Ile Val Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Gly Ile His  
 290 295 300  
 Met Gly Pro Gly Gln Val Leu Tyr Ala Thr Gly Glu Ile Ile Gly Asp  
 305 310 315 320  
 Ile Arg Lys Ala Tyr Cys Asn Ile Ser Arg Lys Asp Trp Asn Asn Thr  
 325 330 335  
 Leu Arg Arg Val Ala Lys Lys Leu Arg Glu His Phe Asn Lys Thr Ile  
 340 345 350  
 Asp Phe Thr Ser Pro Ser Gly Gly Asp Ile Glu Ile Thr Thr His Ser  
 355 360 365  
 Phe Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Thr Leu Phe  
 370 375 380  
 Asn Ser Ser Trp Asp Glu Asn Asn Ile Lys Asp Thr Asn Ser Thr Asn  
 385 390 395 400  
 Asp Asn Thr Thr Ile Thr Ile Pro Cys Lys Ile Lys Gln Ile Val Arg  
 405 410 415

Met	Trp	Gln	Arg	Thr	Gly	Gln	Ala	Ile	Tyr	Ala	Pro	Pro	Ile	Ala	Gly	420	425	430	
Asn	Ile	Thr	Cys	Lys	Ser	Asn	Ile	Thr	Gly	Leu	Leu	Leu	Thr	Arg	Asp	435	440	445	
Gly	Gly	Asn	Arg	Asn	Gly	Ser	Glu	Asn	Gly	Thr	Glu	Thr	Phe	Arg	Pro	450	455	460	
Thr	Gly	Gly	Asn	Met	Lys	Asp	Asn	Trp	Arg	Ser	Glu	Leu	Tyr	Lys	Tyr	465	470	475	480
Lys	Val	Val	Glu	Leu	Glu	Pro	Leu	Gly	Val	Ala	Pro	Thr	Lys	Ala	Lys	485	490	495	
Arg	Arg	Val	Val	Glu	Arg	Glu	Lys	Arg	Ala	Val	Gly	Ile	Gly	Ala	Val	500	505	510	
Phe	Leu	Gly	Phe	Leu	Gly	Thr	Ala	Gly	Ser	Thr	Met	Gly	Ala	Ala	Ser	515	520	525	
Ile	Thr	Leu	Thr	Val	Gln	Val	Arg	Gln	Leu	Leu	Ser	Gly	Ile	Val	Gln	530	535	540	
Gln	Gln	Ser	Asn	Leu	Leu	Lys	Ala	Ile	Xaa	Ala	Gln	Gln	His	Leu	Leu	545	550	555	560
Lys	Leu	Thr	Val	Trp	Gly	Ile	Lys	Gln	Leu	Gln	Ala	Arg	Val	Leu	Ala	565	570	575	
Val	Glu	Arg	Tyr	Leu	Lys	Asp	Gln	Gln	Leu	Leu	Gly	Ile	Trp	Gly	Cys	580	585	590	
Ser	Gly	Lys	Leu	Ile	Cys	Thr	Thr	Asn	Val	Pro	Trp	Asn	Ala	Ser	Trp	595	600	605	
Ser	Asn	Lys	Ser	Tyr	Glu	Asp	Ile	Trp	Glu	Asn	Met	Thr	Trp	Ile	Gln	610	615	620	
Trp	Glu	Arg	Glu	Ile	Asn	Asn	Tyr	Thr	Gly	Ile	Ile	Tyr	Ser	Leu	Ile	625	630	635	640
Glu	Glu	Ala	Gln	Asn	Gln	Gln	Glu	Thr	Asn	Glu	Lys	Asp	Leu	Leu	Ala	645	650	655	
Leu	Asp	Lys	Trp	Thr	Asn	Leu	Trp	Asn	Trp	Phe	Asn	Ile	Ser	Asn	Trp	660	665	670	
Leu	Trp	Tyr	Ile	Lys	Ile	Phe	Ile	Met	Ile	Ile	Gly	Gly	Leu	Ile	Gly	675	680	685	
Leu	Arg	Ile	Ile	Phe	Ala	Val	Leu	Ala	Ile	Val	Asn	Arg	Val	Arg	Gln	690	695	700	
Gly	Tyr	Ser	Pro	Leu	Ser	Phe	Gln	Thr	Leu	Ile	Pro	Asn	Pro	Thr	Glu	705	710	715	720
Ala	Asp	Arg	Pro	Gly	Gly	Ile	Glu	Glu	Gly	Gly	Gly	Glu	Gln	Gly	Arg	725	730	735	
Thr	Arg	Ser	Ile	Arg	Leu	Val	Asn	Gly	Phe	Leu	Ala	Leu	Ala	Trp	Asp	740	745	750	

Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe  
 755 760 765  
 Val Leu Ile Ala Ala Arg Thr Val Gly Thr Leu Gly Leu Arg Gly Trp  
 770 775 780  
 Glu Ile Leu Lys Tyr Leu Val Asn Leu Val Trp Tyr Trp Gly Gln Glu  
 785 790 795 800  
 Leu Lys Asn Ser Ala Ile Ser Leu Leu Asn Thr Thr Ala Ile Ala Val  
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 Ala Glu Gly Thr Asp Arg Ile Ile Glu Ile Ala Gln Arg Ala Phe Arg  
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 Ala Ile Leu His Ile Pro Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala  
 835 840 845  
 Leu Leu  
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<210> 26  
 <211> 204  
 <212> PRT  
 <213> Human immunodeficiency virus

<220>  
 <221> MOD\_RES  
 <222> (132)  
 <223> Variable amino acid

<400> 26  
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 Arg Arg Ala Ala Pro Ala Pro Ala Ala Asp Gly Val Gly Ala Val Ser  
 20 25 30  
 Gln Asp Leu Ala Lys His Gly Ala Ile Thr Ser Ser Asn Thr Ala Ala  
 35 40 45  
 Thr Asn Asp Asp Cys Ala Trp Leu Glu Ala Gln Thr Glu Glu Glu Val  
 50 55 60  
 Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr Tyr Lys  
 65 70 75 80  
 Gly Ala Phe Asp Leu Ser Phe Phe Leu Lys Glu Lys Gly Gly Leu Asp  
 85 90 95  
 Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp Leu Trp Val  
 100 105 110  
 His Asn Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr Thr Pro Gly  
 115 120 125  
 Pro Gly Thr Xaa Tyr Pro Leu Thr Phe Gly Trp Cys Phe Lys Leu Val  
 130 135 140  
 Pro Val Asp Pro Ser Glu Val Glu Glu Ala Asn Glu Gly Glu Asn Asn  
 145 150 155 160

Cys Leu Leu His Pro Ala Cys Gln His Gly Ile Glu Asp Glu Glu Arg  
165 170 175  
Glu Val Leu Lys Trp Lys Phe Asp Ser Ser Leu Ala Arg Arg His Ile  
180 185 190  
Ala Arg Glu Leu His Pro Glu Phe Tyr Lys Asp Cys  
195 200

<210> 27  
<211> 158  
<212> PRT  
<213> Human papillomavirus

<400> 27  
Met Ala Arg Phe Glu Asp Pro Thr Arg Arg Pro Tyr Lys Leu Pro Asp  
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Leu Cys Thr Glu Leu Asn Thr Ser Leu Gln Asp Ile Glu Ile Thr Cys  
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Val Tyr Cys Lys Thr Val Leu Glu Leu Thr Glu Val Phe Glu Phe Ala  
35 40 45  
Phe Lys Asp Leu Phe Val Val Tyr Arg Asp Ser Ile Pro His Ala Ala  
50 55 60  
Cys His Lys Cys Ile Asp Phe Tyr Ser Arg Ile Arg Glu Leu Arg His  
65 70 75 80  
Tyr Ser Asp Ser Val Tyr Gly Asp Thr Leu Glu Lys Leu Thr Asn Thr  
85 90 95  
Gly Leu Tyr Asn Leu Leu Ile Arg Cys Leu Arg Cys Gln Lys Pro Leu  
100 105 110  
Asn Pro Ala Glu Lys Leu Arg His Leu Asn Glu Lys Arg Arg Phe His  
115 120 125  
Lys Ile Ala Gly His Tyr Arg Gly Gln Cys His Ser Cys Cys Asn Arg  
130 135 140  
Ala Arg Gln Glu Arg Leu Gln Arg Arg Arg Glu Thr Gln Val  
145 150 155

<210> 28  
<211> 105  
<212> PRT  
<213> Human papillomavirus

<400> 28  
Met His Gly Pro Lys Ala Thr Leu Gln Asp Ile Val Leu His Leu Glu  
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Pro Gln Asn Glu Ile Pro Val Asp Leu Leu Cys His Glu Gln Leu Ser  
20 25 30  
Asp Ser Glu Glu Glu Asn Asp Glu Ile Asp Gly Val Asn His Gln His  
35 40 45  
Leu Pro Ala Arg Arg Ala Glu Pro Gln Arg His Thr Met Leu Cys Met



50		55		60
Cys Cys Lys Cys Glu Ala Arg Ile Glu Leu Val Val Glu Ser Ser Ala				
65		70		75
Asp Asp Leu Arg Ala Phe Gln Gln Leu Phe Leu Lys Thr Leu Ser Phe				
	85		90	95
Val Cys Pro Trp Cys Ala Ser Gln Gln				
	100		105	

<210> 29  
 <211> 843  
 <212> DNA  
 <213> Human papillomavirus

<400> 29  
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 atagaaataa cctgtgtata ttgcaagaca gtattggaac ttacagaggt atttgaattt 180  
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 aag 843

<210> 30  
 <211> 11835  
 <212> DNA  
 <213> Epstein Barr virus

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<212> DNA

<213> Plasmodium falciparum

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<210> 36  
 <211> 2509  
 <212> DNA  
 <213> Homo sapiens

<400> 36						
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<210> 37

<211> 1782

<212> DNA

<213> Homo sapiens

<400> 37

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<213> Artificial Sequence

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<220>
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<210> 39
<211> 15
<212> PRT
<213> Artificial Sequence

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<220>
<223> Description of Artificial Sequence: Synthetic
      peptide

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<400> 39
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<210> 40
<211> 70
<212> DNA
<213> Artificial Sequence

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<220>
<223> Description of Artificial Sequence: Synthetic
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catgataggc 70

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<210> 41
<211> 50
<212> DNA
<213> Artificial Sequence

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<220>
<223> Description of Artificial Sequence: Synthetic
      primer

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<400> 41
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